Survivorship bias and comparability of UK open-ended fund databases.

Bernd Hanke
Global Systematic Investors LLP

Aneel Keswani
Cass Business School, City University

Garrett Quigley
Global Systematic Investors LLP

Maxim Zagonov*
Toulouse Business School

Abstract

In this paper, we compare returns contained in two widely used databases of UK unit trusts: Morningstar and S&P Micropal. Considering funds for which both sources have data, differences in returns between the databases are considerable and often of sufficient magnitude that they should be of significant concern to researchers. Such data inconsistencies frequently lead to material differences in performance measurement results. We believe that the observed differences raise serious issues with regard to the comparability of results and conclusions of performance studies of UK funds that use different data sets.

Keywords: unit trusts; survivorship bias; data quality

Subject classification codes: G11; G12

* Corresponding author: Maxim Zagonov. Address: 20, bd Lascrosses, 31068 Toulouse, France. Telephone: +33 561 29 49 49. Email: m.zagonov@tbs-education.fr

1. Introduction

The rapid expansion of the UK fund industry over the past few decades ensured its place as the largest European asset management centre and the second largest in the world. By the end of 2017, UK authorised funds had around £1.2 trillion of assets under management[1]. The industry has experienced an average annualised growth in assets under management of approximately 14.5% since year-end 2008, with the value of assets under management in funds within the UK equity sector increasing by 13.5% (£55 billion) per annum.

Most collective investment schemes in the UK are structured as unit trusts or open-ended investment companies (OEICs). Both unit trusts and OEICs are open-ended investment products, which means the number of shares (OEICs) or units (unit trusts) in the scheme expands or contracts according to investor flows, as does the size of the fund. Based on their key characteristics, UK unit trusts and OEICs are often recognised as equivalent to open-ended US mutual funds. This allows direct comparison between fund performance in the UK and the US, which has been the subject of numerous studies. However, while many studies examine US mutual funds, very few UK open-ended fund performance studies exist. This is presumably due to limited data availability, particularly when it comes to funds that cease to exist through liquidations or mergers (non-surviving funds)[2]. Consistent and reliable data on the historical performance of non-surviving UK funds are rarely available to researchers. Therefore, high-performance, surviving funds tend to be over-represented in the analysed samples. This problem is commonly referred to as "survivorship bias". As it is more likely that funds performing poorly relative to a peer universe disappear over time, failing to account for non-survivors leads to an upward distortion of the true average performance of managed funds and may also lead to spurious observed performance persistence.

[1] The data come from the Investment Association's Asset Management Survey 2016-2017 and fund statistics.

[2] Compared to the data sets covering UK funds, a consistent survivor-bias free database of US mutual funds has been maintained by the Center for Research in Security Prices (CRSP) since 1995 and offered researchers data on the universe of both surviving and non-surviving US funds going as far back as 1962.

While researchers attempt to correct and control for survivorship bias, it remains a concern for most existing UK fund studies. Moreover, there are major inconsistencies across published works and databases pertaining to the treatment of non-surviving funds, which includes the two most widely-used fund databases, namely Micropal (also known as S&P Micropal) and Morningstar.

A major advantage of the Micropal dataset is that it includes more information on non-surviving funds for earlier periods (e.g. 1970-90s). Morningstar also provides data on non-survivors. However, the database's coverage of such funds is limited and inconsistent before and during the 1990s. One important caveat is that Micropal was acquired by Morningstar, Inc. in 2007 and its data set of UK funds no longer exists as a standalone product. Despite this acquisition it is not clear to what extent the original Micropal data were incorporated in the existing Morningstar data set. Therefore, the consistency and comparability of the data in the two databases widely used in published research is an open question that merits further investigation. Any inconsistencies in the data, particularly if they are sizable, are of paramount concern. Inconsistencies may bias fund performance conclusions and limit comparability of findings across studies. After all, empirical results are customarily compared and contrasted between studies irrespective of the source of data used in those studies.

We address this concern by asking a simple question: if researchers consider UK unit trusts for which Micropal and Morningstar have return data, are these data the same? By and large, the answer is a qualified no, as differences in returns between the two data sets are considerable and often of sufficient magnitude to be of significant concern to researchers. As numerous data inconsistencies exist, we further explore whether such inconsistencies lead to differences in performance measurement results. For each fund, we obtain risk-adjusted returns (alphas) with the Fama-French-Carhart four-factor model using Micropal and Morningstar data for a number of subperiods. We then calculate differences in the estimated four-factor alphas. Overall, we find that differences in monthly returns lead to material differences in risk-adjusted returns for all analysed subperiods. The observed differences in alphas lead us to believe that conclusions derived from empirical studies of fund performance may be affected depending on whether researchers use Micropal or Morningstar data.

Therefore, a meaningful comparison of results and overall conclusions with those reported in previously published works utilising a different data set requires an impressive leap of faith.

2. Literature review

Previous studies focusing on the performance of UK open-ended funds use various data sources, with Micropal and Morningstar being the most widely used. The Internet Appendix provides an overview of data sources and samples used by a representative sample of recent UK studies.

Blake and Timmermann (1998) examine the performance of 2375 unit trusts, including 973 non-survivors, over the period from 1972 to 1995, using data collected from Micropal. Quigley and Sinquefield (2000) evaluated the performance of unit trusts over the 1978 to 1997 period based on the Micropal database. The latter study examines a sample of 752 unit trusts, including 279 non-survivors. A later work by Keswani and Stolin (2008) extends the sample of Quigley and Sinquefield (2000) to 2003.

Cuthbertson et al. (2010) analyse the market timing ability of UK funds using a 1988-2002 sample derived from the Morningstar database. The Morningstar data set is later used by Clare et al. (2014), Clare, O'Sullivan, and Sherman (2014), Foran and O'Sullivan (2014), Mateus et al. (2016), and Blake et al. (2017) among others. Notably, the researchers drawing their samples from both Micropal and Morningstar make attempts to control for survivorship bias by taking fund returns into account, if available, until funds disappear. However, the databases' coverage of non-surviving funds is highly inconsistent over time, as Table 1[3] suggests. The data sets seem to achieve a more consistent coverage of non-survivors from 2002-2003 onwards only.

--- Include Table 1 here ---

[3] Table 1 provides an extract of a detailed comparison of data sets used in select academic publications, detailing the total number of fund deaths during the calendar years spanned by the utilised sample periods.

The inconsistent data coverage reported in the literature raises concerns about data comparability between Micropal and Morningstar, the two main data providers in this area. Specifically, if one considers funds for which Micropal and Morningstar have return data, are these data the same? If not, do data inconsistencies lead to differences in performance measurement results? We examine these questions in the next section.

3. Data and results

We address two distinct questions. First, we examine how non-surviving funds are treated by the two vendors and whether their non-surviving samples coincide. Second, using a matched sample of funds from both vendors, we examine whether the reported data are the same.

Micropal fund data are obtained from Quigley and Sinquefield (2000) and Keswani and Stolin (2008) and cover the 1978 to December 2003 period. Morningstar fund data are from Keswani et al. (2016) who examine a sample of UK funds from 1980 to 2013.

First, we select the period for which the two data sets overlap, namely 1980 through 2003, and identify all non-surviving funds: funds that have been liquidated, merged/restructured, and stopped reporting returns to the data vendor (in the case of Morningstar) over the period examined.

The number of non-surviving UK funds with returns data available in Micropal, and fund mortalities by year, are consistent with the information provided in columns 2 and 3 of Table 1. Morningstar also retains the information on dead funds, but the coverage is limited to virtually non-existent before 2002. For this reason, no meaningful comparison of the data on non-survivors in the two data sets is possible, except for the last two years of the sample. When considering the 2002-2003 data, the samples of non-survivors overlap only partially, with a mere 22 percent of funds identified as defunct by Micropal also covered by Morningstar. This observation confirms that the Morningstar database suffers from survivorship bias for the earlier period, before 2003. Notably, the number of non-surviving funds with data consistently available in the Morningstar database increased significantly in recent years (see columns 5 and 6 of Table 1). When it comes to the quality and consistency of the data between the two data sets, the observations we make below for surviving funds

are equally applicable to the analysed non-survivors. However, as the available Micropal data sample ends in 2003, we are unable to assess the overall quality and completeness of the Morningstar data on non-survivors after 2003.

Second, to address the question of data consistency and comparability, we select a sample of funds for which Micropal and Morningstar both have return data available for the same period and compare them. If there are discrepancies, we examine whether they lead to material differences in performance measurement results. Once again, we select the 1980 to 2003 period, where the data sets from Quigley and Sinquefield (2000)/Keswani and Stolin (2008) and Keswani et al. (2016) overlap, and identify all funds with complete sets of monthly returns available for at least 36 consecutive months in both Micropal and Morningstar. The resulting sample contains 32 funds.

We follow Elton et al. (2001) and split the entire 23-year period into four five-year and one three-year subperiods. This approach is consistent with previous studies on performance measurement which typically use five-year periods to analyse and compare fund performance. Performing our analyses on a number of consecutive subperiods also allows us to examine the extent to which the data becomes more consistent across data sources over time. To test the robustness of our results, we also rerun all analyses over the full 23-year period.

First, we obtain risk-adjusted returns (alphas) from the Fama-French-Carhart four-factor model using Micropal and Morningstar data for each of the five subperiods:

$$R_{it} - RF_t = \alpha_i + \beta_i^{MKT} MKT_t + \beta_i^{SMB} SMB_t + \beta_i^{HML} HML_t + \beta_i^{UMD} UMD_t + e_{it} \quad (1)$$

where the Fama-French (1992, 1993) and Carhart (1997) factors are obtained from Gregory et al. (2013).

We then calculate differences in four-factor alphas and report them in Table 2. The four-factor alphas estimated using the two data sources are materially different across all subperiods and funds. The differences in alphas are most pronounced in the 1981 to 1985 subperiod, with the average difference of about 71.5 basis points per year. This is almost twice as large as the median four-factor alpha of actively managed UK funds over 1988 to 2013, which is approximately -40 basis points per year (Keswani et al. 2016). The reported alpha differences highlight that conclusions derived from

fund performance studies may be strongly affected by the choice of data source, even if the differences in alphas are smaller in later periods. The average annualised difference falls to approximately 11 basis points in the 1991 to 1995 subperiod but increases again to 45 basis points in the last three-year period.

--- Include Table 2 here ---

A closer look at the individual funds' risk adjusted returns reveals a number of relatively large differences in alphas. Out of the 102 analysed differences in alpha, 8 are equal to or greater than 120 basis points per year (10 basis points per month), 19 are equal to or greater than 60 basis points per year, and 72 are at least 12 basis points per year or higher. The large differences in alphas are spread nearly evenly over the 23 years, whereas the number of small differences seems to increase over time.

When analysing the performance of individual funds over the full 23-year period, 9 out of the 32 analysed differences in alphas are at least 120 basis points per year of higher, 23 are at least 60 basis points, and 30 are 12 basis points or more (Table 2: Panel B). Admittedly, the full sample period of 23 years is significantly longer than what is considered in most previous studies of fund performance.

Overall, the differences in alphas are sufficiently large that conclusions about fund performance strongly depend on the choice of data source. Comparing fund performance results across studies using different data sources requires an impressive leap of faith.

The differences in four-factor alphas reported are due to differences in returns between Micropal and Morningstar. While we are unable to examine which data source is more accurate, Table 3 provides a more detailed look at the differences in returns between the two data sets.

--- Include Table 3 here ---

As with alphas, the differences in returns are most pronounced in the 1981 to 1985 subperiod. The annualised average difference over the full 23-year sample period is approximately 0.25 percent. The table also suggests that return differences have declined over the years, particularly the number of

large differences of six percent per year or more. The latter observation is consistent with the findings of Elton et al. (2001) on the differences in returns reported by the CRSP and Morningstar data sets for a sample of US mutual funds over a similar time period (1979-1998). Consistent with our findings, the authors point to a large number of differences between the two data sets of "sufficient magnitude to be of concern to a researcher".

4. Conclusion

While recent fund performance studies widely acknowledge the existence of survivorship bias and attempt to control for it, there are major inconsistencies across studies pertaining to the treatment of non-survivors and the number of non-surviving funds included in the analysis. Such inconsistencies emanate largely from data differences that exist between UK fund data providers. We carry out a detailed comparison of the two most widely used UK fund databases with respect to data coverage and comparability. Our analysis reveals discrepancies of sufficient magnitude to strongly affect conclusions drawn by researchers. We find differences in reported fund returns between the two databases in 33 percent of the cases. Even more importantly, meaningful differences in risk-adjusted returns exist across virtually all analysed subperiods and funds. The large magnitude of differences in risk-adjusted returns indicates that findings reported in the previous fund performance literature could be strongly influenced by the choice of data set. Comparing the results of different fund studies based on different data sources requires an impressive leap of faith.

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Table 1. Number of non-surviving funds (by year) in published studies

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(9)	(10)
Publication	Lunde, Timmermann & Blake (1999)*	Quigley & Sinquefield (2000)*	Keswani & Stolin (2008)	Giles, Wilsdon & Worboys (2002)	Foran & O'Sullivan (2014)	Mateus, Mateus & Todorovic (2016)	Cuthbertson, Nitzsche & O'Sullivan (2008)	Cuthbertson, Nitzsche & O'Sullivan (2010)	Clare, O'Sullivan & Sherman (2014)
Year/Data source	Micropal Ltd	Micropal Ltd	from (2); Micropal Ltd	from (2); Money Management (1998-01)	Morningstar	Morningstar	Fenchurch Corporate Services	Morningstar	Morningstar
1977	2								
1978	10	3							
1979	9	1							
1980	17	5							
1981	24	9							
1982	29	15							
1983	18	9		45					
1984	24	12							
1985	21	6							
1986	21	2							
1987	48	8							
1988	57	13		88					
1989	75	16							
1990	91	26							
1991	130	25							
1992	90	16	16			0			
1993	118	26	26	101		0			
1994	109	22	22			0			
1995	80	24	24			0			
1996		11	11			0			
1997		30	30		0	0			
1998			33	200	0	0			
1999			60		228	1			
2000			22		0	0			
2001			42		0	1			
2002			49		0	0			
2003			48		5	0			
2004					0	0			
2005					62	1			
2006					37	14			
2007					116	32			
2008					223	28			
2009					0	61			
2010						45			
2011						51			
2012						41			
Total	973	279	383	434	671	275	236	241	658

* Lunde, Timmermann, and Blake (1999) consider funds that cover a wide range of mandates, including non-UK equity mandates, whereas Quigley and Sinquefield (2000) focus exclusively on UK equity mandates.

Table 2. Differences in monthly alphas estimated using Morningstar and Micropal monthly return data (in basis points)

Panel A: Subsamples

Sample period	Number of funds with non-zero difference	Avg. difference	Avg. absolute difference	Number of differences greater than or equal to:			Number of funds
				10 basis points	5 basis points	1 basis point	
1981-1985	9	5.96	6.11	1	2	5	9
1986-1990	15	1.62	4.95	3	4	11	15
1991-1995	23	0.92	1.49	0	1	11	23
1996-2000	26	2.46	3.73	1	6	22	26
2001-2003	29	3.75	3.77	3	6	23	29
Total	102	2.94	4.01	8	19	72	32

Panel B: Full sample

Sample period	Number of funds with non-zero difference	Avg. difference	Avg. absolute difference	Number of differences greater than or equal to:			Number of funds
				10 basis points	5 basis points	1 basis point	
1981-2003	32	2.03*	3.31*	9	23	30	32

All values are expressed in basis points. Monthly alphas are estimated from the Fama-French-Carhart four-factor model using Morningstar and Micropal monthly return data. The Fama-French (1992, 1993) and Carhart (1997) factors are obtained from Gregory, Tharyan and Christidis (2013). The average difference (average absolute difference) is measured as the alpha using Morningstar data minus the alpha using Micropal data. The Morningstar fund data are from Keswani, Stolin, and Zagonov (2016), whereas the Micropal fund data are obtained from Quigley and Sinquefield (2000) and Keswani and Stolin (2008). * indicates statistical significance at the 1% level.

Table 3. Differences in monthly total returns using Morningstar and Micropal monthly return data (in percent)

Sample period	Number (percentage) of months with non-zero difference	Avg. difference	Avg. absolute difference	Number (percentage) of differences greater than or equal to:			Total months
				5%	1%	0.5%	
1981-1985	231 (42.62%)	0.035%	0.191%	2 (0.37%)	29 (5.35%)	62 (11.44%)	542
1986-1990	237 (27.09%)	0.016%	0.149%	3 (0.34%)	32 (3.66%)	54 (6.17%)	875
1991-1995	394 (28.59%)	0.010%	0.055%	1 (0.07%)	14 (1.02%)	36 (2.61%)	1378
1996-2000	584 (37.97%)	0.023%	0.098%	0 (0.00%)	35 (2.28%)	83 (5.40%)	1538
2001-2003	336 (32.68%)	0.030%	0.057%	0 (0.00%)	14 (1.36%)	26 (2.53%)	1028
Total	1782 (33.24%)	0.021%	0.097%	6 (0.11%)	124 (2.31%)	261 (4.87%)	5361

All values are expressed in percent. The average difference (average absolute difference) is measured as the fund return using Morningstar data minus the fund return using Micropal data. The Morningstar fund data are from Keswani, Stolin, and Zagonov (2016), whereas the Micropal fund data are obtained from Quigley and Sinquefield (2000) and Keswani and Stolin (2008).